MERCURY

Applied Nitrogen Services for Oil & Gas Operations

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Introduction:

Nitrogen plays a vital role in oil and gas operations, offering a safe, inert, and versatile medium for numerous well and facility applications. The Applied Nitrogen Services for Oil & Gas Operations course is designed to equip engineers, technicians, and
operations personnel with the knowledge and practical skills required to safely and efficiently implement nitrogen-related services across upstream, midstream, and downstream sectors.
This training provides participants with a deep understanding of nitrogen's properties, supply systems, and operational applications, ranging from well stimulation and underbalanced drilling to pipeline purging, inerting, and pressure testing. Through hands-on instruction and case study analysis, the course emphasizes best practices, equipment handling, HSE compliance, and field execution for successful nitrogen service delivery.
The course ensures that participants are proficient in planning, performing, and monitoring nitrogen-based operations while managing risk and complying with industry standards. Participants will be empowered to leverage nitrogen's capabilities to optimize production, protect assets, and enhance operational safety in complex oil and gas environments.

Targeted Groups:

- Field Engineers and Well Services Personnel
- Production and Operations Engineers
- Maintenance Supervisors
- Pipeline and Process Engineers
- Drilling and Completion Engineers
- HSE Officers and Safety Supervisors
- Technical Support and Service Company Personnel
- Plant Operators and Technicians

Course Objectives:

- By the end of this Applied Nitrogen Services for Oil & Gas Operations course, participants will be able to:
- Understand the chemical and physical properties of nitrogen and its relevance to oil & gas applications.
- Identify and operate different nitrogen generation and pumping systems.
- Apply nitrogen safely and effectively for purging, pressure testing, inerting, and well servicing.
- Design and execute nitrogen jobs with a focus on efficiency and safety.
- Perform pressure and volume calculations relevant to field operations.
- Recognize and mitigate HSE risks associated with nitrogen handling.
- Understand and apply best practices in monitoring and maintaining nitrogen-related equipment.
- Analyze operational challenges through real-world case studies.
- Ensure regulatory and safety compliance during nitrogen service operations.

Targeted Competencies:

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- Knowledge of nitrogen service applications in the upstream, midstream, and downstream sectors.
- Technical skills in nitrogen job design and field execution.
- Competency in operating and troubleshooting nitrogen equipment.
- Proficiency in HSE procedures specific to nitrogen.
- Capability to interpret pressure charts, flow data, and operational diagnostics.
- Experience in job planning, coordination, and documentation.
- Enhanced decision-making in high-pressure nitrogen operations.
- Awareness of new technologies and industry trends in nitrogen services.

Course Content:

Unit 1: Fundamentals of Nitrogen in Oil & Gas:

- Overview of nitrogen properties and behavior under pressure/temperature.
- Nitrogen's role across various oil and gas applications.
- Comparison of nitrogen vs. alternative gases.
- Storage, transport, and vaporization techniques.
- MSDS review and nitrogen-specific hazards asphyxiation, embrittlement, etc..

Unit 2: Nitrogen Equipment and Technology:

- Cryogenic liquid nitrogen pumping units NPUs.
- Membrane nitrogen generators and PSA systems.
- Pressure control devices, hoses, and instrumentation.
- Operation, maintenance, and calibration of nitrogen equipment.
- Safety interlocks and ESD features.

Unit 3: Operational Applications:

- Pipeline purging and pigging operations.
- Leak detection, pressure testing hydro/nitrogen/helium mix.
- Inerting and blanketing in process plants.
- Foam and nitrogen lift for well stimulation.
- Support in underbalanced drilling and managed pressure drilling MPD.
- Gas displacement and dewatering of pipelines.

Unit 4: Field Execution & Job Design:

- Job planning and procedure development.
- Nitrogen volume, pressure, and rate calculations.
- Pressure charts, thermodynamic behavior, and flow predictions.
- Managing temperature drop, hydrate formation, and flow assurance.
- Coordination with other service providers coiled tubing, cementing, etc..

Unit 5: HSE, Regulations & Best Practices:

- Identification and control of nitrogen-specific risks.
- PPE and confined space entry considerations.
- Environmental impact and venting protocols.
- Compliance with local and international standards OSHA, API, etc..
- Emergency response and rescue planning.